REGULATION III - CONTROL OF AIR CONTAMINANTS

RULE 331
SOLVENT CLEANING

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MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS

REGULATION III - CONTROL OF AIR CONTAMINANTS

RULE 331
SOLVENT CLEANING

SECTION 100 - GENERAL

101 PURPOSE: To limit the emissions of volatile organic compounds (VOCs) from cleaning operations.

102 APPLICABILITY: This rule is applicable to operations using VOC-containing solvents to remove impurities from exterior or interior surfaces.

102.1 Solvents regulated by this rule may also be regulated by New Source Performance Standards (NSPS), Rule 360 and/or National Emission Standards for Hazardous Air Pollutants (NESHAPs), Rule 370.

102.2 This rule is not applicable to:

a. Solvent cleaning operations specifically regulated by another rule within Rules 300 through 359 (See subsection 308.1).

b. Laundering and housekeeping supplies and activities.

c. Testing for surface cleanliness or the cleaning of laboratory equipment at the laboratory.

d. A cleaning solution containing 2.0% or less VOC (by either weight or volume), or equivalent, as shown by any of the following:

(1) Is composed of at least 98% water by either weight or volume; or

(2) Contains only water and material which is a dry solid before mixing with water; or

(3) Has a VOC content not exceeding 20 grams per liter (0.17 lb/gal).

102.3 Partial or conditional exemptions from this rule are set forth in subsections 308.2, 308.3, and 308.4.

SECTION 200 - DEFINITIONS: For the purpose of this rule, the following definitions shall apply:

201 AGITATION, AGITATED - A means or state that moves cleaning liquid continuously back and forth, or up and down. This includes such motion created by sound waves, and to the splashing of a rinse stream operated at a pressure that creates a trajectory exceeding 2 feet along the horizontal plane intersecting the nozzle when the nozzle is at a 45° angle above the plane. Liquid motion incidental to a continuous entrance or withdrawal of objects undergoing cleaning is not agitation.

202 BATCH CLEANING MACHINE - A solvent cleaning machine in which individual parts or a set of parts move through the entire cleaning cycle before new parts are introduced into the solvent cleaning machine. A solvent cleaning machine, such as a ferris wheel or a cross-rod degreaser, that cleans multiple batch loads simultaneously and is manually loaded, is a batch cleaning machine.

203 BLASTING/MISTING WITH SOLVENT - Cleaning with an applicator that propels cleaning-solvent through the air with a pressure exceeding 10 psig (516 mm Hg), or that atomizes the solvent into mist and/or droplets.

204 CABINET STYLE CLEANING MACHINES - Cleaning machines typically similar in design to domestic dishwashers that are completely enclosed except for optional stack, and have their own reservoir and sump.

205 CARRY-OUT - Solvent carried out of a cleaning machine along with a part being removed from the cleaning machine. The solvent may exist as a liquid coating the part or the part's hanger, or as a liquid entrapped in cavities and irregular surfaces, or entrapped by capillary action within or on the part.

206 CLEANING-SOLVENT - Solvent used for cleaning that contains more than 2.0% VOC by weight and more than 20 grams of VOC per liter (0.17 lb/gal).

207 CONFORMING SOLVENT - A cleaning-solvent that has a Total VOC Vapor Pressure conforming to the limits in Table 1 (subsection 304.1). On November 1, 2001, and thereafter, the limit is 1 mm Hg at 20°C (68°F).

208 DEGREASER - See ***SOLVENT CLEANING MACHINE*.**

209 DRY SOLID - Any substance that appears and feels dry and that shatters or pulverizes when struck with a hard object. Evaporating solids, all of which have a strong odor, are not included.

210 EMISSION CONTROL SYSTEM (ECS) - A system, approved in writing by the Control Officer, designed and operated in accordance with good engineering practice to reduce emissions of volatile organic compounds. Such system consists of an emissions collection subsystem and an emissions processing subsystem.

211 FLUSHING WITH SOLVENT - Introducing cleaning-solvent directly into the internal space(s) of an object or assembly using a hose or pipe.

212 FREEBOARD HEIGHT -

212.1 **Batch Cleaning Machine:** The vertical distance from the solvent/air interface to the least elevated point of the top-rim when the cover is open or removed, measured during idling mode.

212.2 **In-Line Cleaning Machine:** The vertical distance from the solvent/air interface to the lowest entry/exit point, measured during idling mode.

213 **FREEBOARD RATIO -** The freeboard height divided by the smaller of the inside horizontal length or the inside horizontal width of the evaporative surface area within the cleaning machine (degreaser).

214 **HEATED SOLVENT -** Any cleaning-solvent which is heated by a device to a temperature exceeding 120°F (38°C).

215 **IMPERVIOUS -** Neither absorbing, adsorbing, nor allowing penetration through, by liquid or vapors.

216 **IN-LINE CLEANING MACHINE (CONTINUOUS CLEANING MACHINE) -** A solvent cleaning machine that uses an automated handling system, typically a conveyor or automated arm(s), to automatically provide a continuous supply of items to be cleaned. The cleaned item leaves by a route different from its entry route.

217 **LEAK** - The state or condition in which a cleaning-solvent, excluding a Low-VOC Cleaner, is allowed to seep or drip, or otherwise enters or escapes, at either the following rate or magnitude:

217.1 Three or more drops of liquid cleaning-solvent per minute; or

217.2 Any puddle of cleaning-solvent greater than 1 square inch.

218 **LOW-VOC CLEANER -** Any solution or homogeneous suspension that, as used, contains less than 50 grams of VOC per liter of material (0.42 lb VOC/gal) or is at least 95% water by weight or volume as determined by an applicable test method in Section 502 of this rule. Within Section 300 and Section 500 of this rule, a Low-VOC Cleaner is subject only to Section 301, Section 302, subsection 307.1, subsection 501.1a, and subsection 501.2.

219 **MAKE-UP SOLVENT -** The increment of cleaning-solvent that replaces solvent lost through evaporation or other means, and that is added to the solvent remaining in a cleaning machine (degreaser) to bring solvent quantity to the desired level.

220 **MATERIAL VOC CONTENT -** See ***VOC CONTENT OF MATERIAL.***

221 **NON-CONFORMING SOLVENT -** A cleaning-solvent that has a Total VOC Vapor-Pressure which exceeds the limits in Table 1 (subsection 304.1) but is legal to use in operations to which this rule applies, because at least one of the following subsections applies to the solvent cleaning operation in which the solvent is used:

221.1 The emissions from the operation are controlled by an ECS per subsection 304.2 or by a Sealed System per subsection 304.3; or

221.2 The operation is exempted by subsection 308.2; or

221.3 The operation is both exempted by subsection 308.3 and complies with subsection 305.3, or for in-line machines, complies with all of Section 306 except subsection 306.4.

222 NON-PRECURSOR ORGANIC COMPOUND - Any of the organic compounds which have been designated by the EPA as having negligible photochemical reactivity. EPA designates such compounds as "exempt". A listing of the compounds is found in Rule 100.

223 ORGANIC COMPOUND - Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

224 REFRIGERATED FREEBOARD CHILLER - A control device which is mounted above any cooling-water jacket or primary condenser coils, consisting of secondary coils which carry a refrigerant to provide a chilled air blanket above the solvent vapor/air interface to reduce emissions from the cleaning machine (degreaser) bath.

225 REMOTE RESERVOIR CLEANING MACHINE (DEGREASER) - Any non-vapor cleaning machine (degreaser) in which the reservoir for storing the cleaning-solvent is completely separated by impervious surfaces from the sink or basin where cleaning is performed, except for a connecting tube or isthmus through which solvent returns to the reservoir when cleaning is stopped.

226 SEALED SYSTEM - An Air-tight or Airless Cleaning System that is operated and equipped pursuant to subsection 304.3 of this rule.

227 SOLVENT - For the purposes of this rule, any liquid or vapor which is used to dissolve, clean, strip, or remove impurities, coatings, contaminants, or films from surfaces or from internal spaces and voids. In addition to VOC-containing solvents, this also includes plain water and mixtures containing water.

228 SOLVENT CLEANING MACHINE (CLEANING MACHINE) (DEGREASER) - Any liquid container and ancillary equipment designed to clean surfaces and/or remove surface contaminants using cleaning-solvents.

229 SOLVENT/AIR INTERFACE -

229.1 Non-Vapor Cleaner: The location of contact between the liquid solvent and the air.

229.2 Vapor Cleaner: The location of contact between the concentrated layer of solvent vapor and the air.

230 SOLVENT/AIR INTERFACE AREA -

230.1 Non-Vapor Cleaner:

a. With Included/Integral Reservoir: The surface area of liquid cleaning-solvent that is exposed to the air.

b. With Remote Reservoir: The surface area of the solvent sink or work area.

230.2 **Vapor Cleaner:** The area of the horizontal plane that is located halfway between the highest and lowest points of the primary condenser coils and which contacts the interior walls of the cleaning machine.

231 **TOTAL VOC VAPOR PRESSURE (VOC COMPOSITE PARTIAL PRESSURE) -** Within a solution or homogenous mixture, it is the sum of the partial pressures of all those components that are defined as VOCs, calculated according to the formula in subsection 502.4.

232 **VAPOR CLEANING MACHINE -** Any cleaning machine in which solvent-vapor from boiling cleaning solvent is utilized for cleaning objects introduced into the vapor zone.

233 **VOC CONTENT OF MATERIAL(MATERIAL VOC CONTENT) -**

VOC CONTENT OF MATERIAL as a percent = $\frac{W_s - W_w - W_{es}}{W_m}$ X 100%

Using consistently either pounds or grams in the calculations:

Where: W_s = weight of volatile material in pounds (or grams), including water, non-precursor organic compounds, and dissolved vapors.

W_w = weight of water in pounds (or grams)

W_{es} = total weight of non-precursor organic compounds in pounds(or grams)

W_m = weight of total material in pounds(or grams)

VOC CONTENT OF MATERIAL in pounds per gallon (g/l) = $\frac{W_s - W_w - W_{es}}{V_m}$

Using consistently either English or metric measures in the calculations

Where: W_s = weight of all volatile material in pounds (or grams) including VOC, water, non-precursor organic compounds and dissolved vapors.

W_w = weight of water in pounds (or grams)

W_{es} = weight of all non-precursor compounds in pounds (or grams)

V_m = volume of total material in gallons (or liters)

234 **VOLATILE ORGANIC COMPOUND (VOC)** - Any organic compound which participates in atmospheric photochemical reactions, except non-precursor organic compounds.

235 **WIPE CLEANING -** That method of cleaning which utilizes a material such as a rag wetted with solvent, coupled with a physical rubbing process, including automated rubbing, to remove contaminants from surfaces.

SECTION 300 - STANDARDS:

301 **SOLVENT HANDLING REQUIREMENTS:** Any person to whom this rule applies must comply with all of the following:

301.1 All cleaning-solvent, including solvent soaked materials, shall be kept in closed leakfree containers that are opened only when adding or removing material.

a. Rags used for wipe cleaning shall be stored in closed containers when not in use.

b. Each container shall be clearly labeled with its contents.

301.2 If any cleaning-solvent escapes from a container:

a. Wipe up or otherwise remove immediately if in accessible areas.

b. For areas where access is not feasible during normal production, remove as soon as reasonably possible.

301.3 Unless records show that VOC-containing cleaning material was sent offsite for legal disposal, it will be assumed that it evaporated on site.

302 EQUIPMENT REQUIREMENTS FOR ALL CLEANING MACHINES: Any person operating a cleaning machine to which this rule applies must comply with all of the following:

302.1 Provide a leakfree container (degreaser) for the solvents and the articles being cleaned.

a. The VOC-containment portion shall be impervious to VOC-containing liquid and vapors.

b. No surface of any freeboard required by this rule shall have an opening or duct through which VOC can escape to the atmosphere, except as controlled by an ECS, or as required by OSHA.

302.2 Properly maintain and operate all cleaning machine equipment required by this rule and any of its emission controls required by this rule.

303 SPECIFIC OPERATING & SIGNAGE REQUIREMENTS FOR CLEANING MACHINES: Any person who cleans with cleaning-solvent other than a Low-VOC Cleaner must conform to all of the following operating requirements:

303.1 Operating Requirements:

a. Fans: Comfort fans shall not be used near cleaning machines.

b. Cover: Do not remove any device designed to cover the solvent unless processing work in the cleaning machine or maintaining the machine.

c. Draining: Drain cleaned parts for at least 15 seconds after cleaning or until dripping ceases, whichever is later.

d. Spraying: If using a cleaning-solvent spray system,

(1) Use only a continuous, undivided stream (not a fine, atomized, or shower type spray).

(2) Pressure at the orifice from which the solvent emerges shall not exceed 10 psig and shall not cause liquid solvent to splash outside of the solvent container.

(3) In an in-line cleaning machine, a shower-type spray is allowed, provided that the spraying is conducted in a totally confined space that is separated from the environment.

(4) Exceptions to foregoing subsections 303.1d(1), (2), and (3) are provided for in Section 307 of this rule.

e. Agitation: No person shall cause agitation of a cleaning-solvent in a cleaning machine by sparging with air or other gas. Covers shall be placed over ultrasonic cleaners when the cleaning cycle exceeds 15 seconds.

f. No Porous Material: Do not place porous or absorbent materials in or on a cleaning machine. This includes, but is not limited to, cloth, leather, wood and rope. No object with a sealed wood handle, including a brush, is allowed after 1999.

g. Vent Rates: The ventilation rate at the cleaning machine shall not exceed 65 cfm per square foot of evaporative surface (20 m^3/min./m^2), unless that rate must be changed to meet a standard specified and certified by a Certified Safety Professional, a Certified Industrial Hygienist, or a licensed professional engineer experienced in ventilation, to meet health and safety requirements.

h. Hoist Speed: Limit the vertical speed of mechanical hoists moving parts in and out of the cleaning machine to a maximum of 2.2 inches per second and 11 ft/min. (3.3 m/min.).

i. Contamination Prevention: Prevent cross contamination of solvents regulated by Section 304 of this rule with solvents that are not so regulated. Use signs, separated work-areas, or other effective means for this purpose. This includes those spray gun cleaning solvents that are regulated by another rule of these Rules and Regulations.

303.2 Signage Requirements: Any person who uses cleaning-solvent, other than Low-VOC Cleaner, in any solvent cleaning machine (degreaser) or dip tank shall provide on the machine, or within 3¼ feet (1 meter) of the machine, a permanent, conspicuous label or placard which includes, at a minimum, each of the following applicable instructions, or its equivalent:

a. “Keep cover closed when parts are not being handled.” (This is not required for remote reservoir cleaners.)

b. “Drain parts until they can be removed without dripping.”

c. “Do not blow off parts before they have stopped dripping.”

d. “Wipe up spills and drips as soon as possible; store used spill rags [or ‘wiping material’] in covered container.”

e. **"**Don't leave cloth or any absorbent materials in or on this tank."

f. For cleaning machines with moving parts such as hoists, pumps, or conveyors, post: "Operating instructions can be obtained from _____," listing a person or place where the instructions are available.

304 SOLVENT SPECIFICATIONS FOR NON-VAPOR CLEANING AND DEGREASING: [Operating requirements specifically for vapor cleaning machines are in the Appendix.] All cleaning solvents, except Low-VOC Cleaners, used in non-boiling cleaning machines shall comply with subsection 304.1 or subsection 304.2 or subsection 304.3, as follows:

304.1 Use a cleaning-solvent having a total VOC vapor pressure at 68°F (20°C) not exceeding the limits in Table 1:

TABLE 1

Limit: Maximum Total VOC Vapor Pressure		**Time Period Limit is in Effect**
2 millimeters of mercury column	----------→	From November 1, 1999 through October 31, 2001
1 millimeter of mercury column	----------→	From November 1, 2001 and thereafter.

304.2 **ECS:** Use an ECS to capture and process VOC emissions in accordance with subsection IV of the Appendix within this rule; or

304.3 **Sealed System:** Use a Sealed System that is an Air-tight or Airless Cleaning System which is operated according to the manufacturer's specifications and, unless otherwise indicated by the manufacturer, meets all of the following requirements:

a. Has a door or other pressure-sealing apparatus that is shut during each cleaning and drying cycle; and

b. Has a differential pressure gauge that always indicates the pressure in the sealed chamber when occupied or in active use; and

c. Any associated pressure relief device(s) shall be so designed and operated as to prevent liquid cleaning-solvents from draining out.

305 NON-VAPOR BATCH CLEANING MACHINES: Equipment requirements for non-vapor batch cleaning machines with remote reservoirs are set forth in subsection 305.1. Equipment standards applicable to non-vapor batch cleaning machines with internal reservoirs (non-remote) are set forth in subsection 305.2. Non-vapor batch cleaning machines with either remote or internal reservoirs that use cleaning-solvents that are either heated, agitated or non-conforming are subject to additional provisions set forth in subsection 305.3. Low-VOC Cleaners are exempt from this section.

305.1 **With Remote Reservoir:** A batch cleaning machine with remote reservoir, including cabinet type(s), shall be equipped with the following:

a. A sink-like work area or basin which is sloped sufficiently towards the drain so as to prevent pooling of cleaning-solvent.

b. A single, unimpeded drain opening or cluster of openings served by a single drain for the cleaning-solvent to flow from the sink into the enclosed reservoir. Such opening(s) shall be contained within a contiguous area not larger than 15.5 square inches (100 cm^2).

c. Solvent Return: Provide a means for drainage of cleaned parts such that the drained solvent is returned to the cleaning machine.

305.2 Cleaning Machine With Internal Reservoir (Non-Remote): A batch cleaning machine without a remote reservoir shall be equipped with all of the following:

a. Have and use an internal drainage rack or other assembly that confines within the freeboard all cleaning-solvent dripping from parts and returns it to the hold of the cleaning machine (degreaser); and

b. Have an impervious cover which when closed prevents cleaning-solvent vapors in the cleaning machine from escaping into the air/atmosphere when not processing work in the cleaning machine.

(1) A cover shall be fitted so that in its closed position the cover is between the cleaning-solvent and any lip exhaust or other safety vent, except that such position of cover and venting may be altered by an operator for valid concerns of flammability established in writing and certified to by a Certified Safety Professional or a Certified Industrial Hygienist to meet health and safety requirements.

(2) A cover is not required when an ECS is used in accordance with subsection IV of the Appendix within this rule.

c. In the absence of additional applicable freeboard standards, freeboard height shall be not less than 6 inches (15.2 cm); and

d. The freeboard zone shall have a permanent, conspicuous mark that locates the maximum allowable solvent level which conforms to the applicable freeboard requirements.

305.3 Using Cleaning-Solvent That Is Heated, Agitated, Or Is Non-Conforming: If a cleaning machine uses a cleaning-solvent at a temperature above 120°F (49°C), uses non-conforming solvent, or agitates the solvent, then comply with one of the following:

a. Remote Reservoir Cleaning Machines: For a remote reservoir cleaning machine, comply with subsection 305.1 and, in addition, use a stopper in the drain or a cover covering the sink whenever the sink or cabinet is empty of solvent and nothing is being handled in the sink.

b. Cleaning Machines With Internal Reservoir: A person using a cleaning machine that has an internal reservoir shall comply with subsection 305.2 and either subsection (1) or (2) that follow:

(1) A Water Cover: A floating layer of water (insoluble in the solvent) at least 1 inch thick, and a freeboard at least 6 inches above the top of the solvent shall be present; or

(2) Freeboard And Cover:

(a) The basin shall have a freeboard ratio of 0.75 or greater and an impervious cover shall cover the basin whenever work is not being processed; and

(b) If a non-conforming solvent is used, the cover shall be of a sliding or rolling type which is designed to easily open and close in a horizontal plane without disturbing the vapor zone.

c. Cabinet Style: Keep a cabinet-style cleaning machine closed at all times that it contains cleaning-solvent, except when introducing or removing work from the machine. If blasting or misting with cleaning-solvent, also conform to the applicable requirements of Section 307.

305.4 ECS Alternative: An operator is allowed to meet the requirements of any one or combination of the requirements of subsections 305.1, 305.2 and/or 305.3 by operating an ECS in accordance with subsection IV of the Appendix within this rule whenever any requirement of subsections 305.1, 305.2 and/or 305.3 is not met.

306 NON-VAPOR IN-LINE CLEANING: No person shall operate an in-line non-vapor cleaning machine using cleaning-solvent unless it complies with subsections 306.1, 306.2, and 306.3 of this rule:

306.1 Features:

a. Carry-Out Prevention: Equip the cleaning machine with either a drying tunnel or another means, such as a rotating basket, sufficient to prevent cleaned parts from carrying out cleaning-solvent liquid or vapor.

b. Enclosed Design: An in-line cleaning machine shall be fully enclosed except for entrance and exit portals.

c. Cover: During shutdown hours or if the cleaning machine is idle for more than 30 minutes, a cover shall be used to close the entrance and exit and any opening greater than 16 square inches (104 cm^2).

306.2 Minimized Openings: Entrances and exits should silhouette workloads so that the average clearance between parts and the edge of the cleaning machine opening is either less than four inches (10 cm), or less than 10 percent of the width of the opening.

306.3 The machine shall have a freeboard ratio greater than or equal to 0.75.

306.4 ECS Alternative: An operator is allowed to meet the requirements of any one or combination of subsections 306.1b, 306.1c, 306.2, and/or 306.3 by operating an ECS that controls VOC vapor from processes addressed by the requirement(s); such ECS shall be operated in accordance with subsection IV of the Appendix within this rule.

307 SPECIAL NON-VAPOR CLEANING SITUATIONS:

307.1 Blasting/Misting With Conforming Solvent: Any person blasting or misting with conforming solvent shall operate and equip the device(s) as follows:

a. Equipment: The device shall have internal drainage, a reservoir or sump, and a completely enclosed cleaning chamber, designed so as to prevent any perceptible liquid from emerging from the device; and

b. Operation: The device shall be operated such that there is no perceptible leakage from the device except for incidental drops from drained, removed parts.

307.2 Blasting/Misting With Non-conforming Solvent: Any person shall use a Sealed System pursuant to subsection 304.3 for all blasting or misting with a non-conforming solvent.

307.3 High Pressure Flushing: Cleaning systems using cleaning-solvent that emerges from an object undergoing flushing with a visible mist or at a pressure exceeding 10 psig, shall comply as follows:

a. Conforming Solvent: For conforming solvent, use a containment system that is designed to prevent any perceptible cleaning-solvent liquid from becoming airborne outside the containment system, such as a completely enclosed chamber.

b. Non-Conforming Solvent: Use a Sealed System for non-conforming solvent.

307.4 ECS Alternative: A person is allowed to meet the requirement(s) of subsection 307.1 and/or subsection 307.2 by operating an ECS that controls VOC vapor from processes addressed by the requirement(s); the ECS shall be operated pursuant to subsection IV of the Appendix within this rule.

308 EXEMPTIONS:

308.1 Categorical Exemptions:

a. Industries and cleaning operations that are not regulated by this rule include, but are not limited to, the following VOC rules in Regulation III:

(1) Dry cleaning with petroleum solvents (Rule 333);

(2) Printing and graphic arts coating (Rule 337);

(3) Semiconductor manufacturing (Rule 338);

(4) Vehicle refinishing (Rule 345);

(5) Automotive windshield washer fluid (Rule 344); and

(6) Architectural Coating (Rule 335).

b. All operations regulated by the following NESHAPs are exempt from Rule 331:

(1) National Emission Standards for Halogenated Solvent Cleaning (40 CFR 63, subpart T). This includes the de minimis amounts of solvent VOCs that are exempted by subpart T.

(2) National Emission Standards for Perchloroethylene for Dry Cleaning Facilities, 40 CFR 63 Subpart M.

c. Exemptions For Qualified Operations:

(1) Cleanup Of Coating-Application Equipment: Operations involving the cleanup of coating-application equipment that are regulated by another rule in Regulation III are exempt from Rule 331. Examples include Rule 336 (Surface Coating Operations) and Rules 342 and 346 (wood coating).

(2) Aerospace: Wipe cleaning of aerospace components is subject to Rule 348, whereas the cleaning of aerospace components in a dip tank, a cleaning machine, or by a flush-cleaning process, is subject to Rule 331.

308.2 Partial Exemption From Section 300: The following are exempt from sections of Section 300 as noted:

a. Wipe Cleaning: The provisions of Sections 302 through 307 do not apply to wipe cleaning. Recordkeeping provisions in Section 500 do apply to wipe cleaning.

b. Small Cleaners: The provisions of Sections 303 through 307 of this rule shall not apply to any non-vapor cleaning machine (degreaser) or dip-tank fitting either of the following descriptions, except that these shall be covered when work is not being processed:

(1) A small cleaner having a liquid surface area of 1 square foot (0.09 square meters) or less, or

(2) A small cleaner having a maximum capacity of one gallon (3.79 liters) or less.

308.3 Exemptions From Section 304: The U.S. Government Printing Office “Standard Industrial Classification Manual, 1987” (and no future editions) is incorporated by reference and is on file at Maricopa County Environmental Services Department,

1001 N. Central Avenue, Suite 201, Phoenix, Arizona 85004-1942. The following are exempt from Section 304 of this rule:

a. Non-furniture medical devices included in Standard Industrial Classification (SIC) codes 3841, 3843, 3844, or 3845, and products for internal use in 3842;

b. Electronic products for space vehicles and communications equipment in SIC codes 3661, 3663, 3669, 3677, 3678, 3679, and 3769; and

c. Production processes having clean-room standards equal to or more stringent than class 100,000 (particles/m^3); and

d. Low viscosity solvent used to clean an aerospace component if the Federal Aviation Authority, the US Department of Defense, or a US Military specification designates that the cleanliness of the component is critical to the flight safety of a complete aerospace vehicle. By January 1, 2001, any such solvents shall be listed in an MCESD air pollution permit, conditioned upon a sufficient demonstration by the user that no compliant substitute exists.

308.4 Comfort Fans: The subsection 303.1a prohibition against fans and fan-drafts being close to cleaning machines does not apply to a totally enclosed cleaning machine that cannot be penetrated by drafts.

309 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT:

309.1 Operation And Maintenance (O&M) Plan Required For ECS:

a. An owner or operator shall provide and maintain (an) O&M Plan(s) for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this rule or to an air pollution control permit.

b. The owner or operator shall submit to the Control Officer for approval the O&M Plans of each ECS and each ECS monitoring device that is used pursuant to this Rule 331.

c. The owner or operator shall comply with all the identified actions and schedules provided in each O&M Plan.

309.2 Providing And Maintaining ECS Monitoring Devices: Any person incinerating, adsorbing, or otherwise processing VOC emissions pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation, devices described in the facility's O&M Plan that indicate temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained.

309.3 O&M Plan Responsibility: An owner or operator of a facility that is required to have an O&M Plan pursuant to subsection 309.1 must fully comply with all O&M Plans that the owner or operator has submitted for approval, but which have not yet been approved, unless notified otherwise by the Control Officer in writing.

SECTION 400 - ADMINISTRATIVE REQUIREMENTS

401 DATE OF EFFECT: By September 1, 1999, signage required by subsection 303.2 shall be complete and in place. By the same date, an owner or operator shall notify the Control Officer in writing of the intention to use an Emission Control System (ECS) as the means of meeting new provisions of this rule revision. Such an ECS shall be in use by May 1, 2000.

SECTION 500 - MONITORING AND RECORDS

501 RECORDKEEPING AND REPORTING: Any person subject to this rule shall comply with the following requirements. Records shall be retained for five years and shall be made available to the Control Officer upon request.

501.1 Current List:

a. Maintain a current list of cleaning-solvents; state the VOC-content of each in pounds VOC per gallon of material or grams per liter of material.

b. A facility using any cleaning-solvent subject to the vapor-pressure limits of subsection 304.1 shall have on site the written value of the total VOC vapor-pressure of each such solvent by November 1, 1999, in one of the following forms:

(1) A manufacturer's technical data sheet,

(2) A manufacturer's safety data sheet (MSDS), or

(3) Actual test results.

501.2 Usage Records:

a. Monthly: Records of the amount of cleaning-solvent used shall be updated by the end of month for the previous month. Show the type and amount of each make-up and all other cleaning-solvent to which this rule is applicable.

b. Annually:

(1) Certain Concentrates: Use of concentrate that is used only in the formulation of Low VOC Cleaner shall be updated at least annually.

(2) Low-VOC Cleaner: An owner or operator need not keep a record of a cleaning substance that is made by diluting a concentrate with water or non-precursor compound(s) to a level that qualifies as a Low VOC Cleaner if records of the concentrate usage are kept in accordance with this rule.

c. Grouping By VOC Content: For purposes of recording usage, an operator may give cleaning-solvents of similar VOC content a single group-name, distinct from any product names in the group. The total usage of all the products in that group are then recorded under just one name. (In such a case, the operator must also keep a separate list that identifies the product

names of the particular solvents included under the group name). To the group name shall be assigned the highest VOC content among the members of that group, rounded to the nearest 10th of a pound of VOC per gallon of material, or to the nearest gram VOC per liter of material.

502 COMPLIANCE DETERMINATION AND TEST METHODS: When more than one test method is permitted for a determination, an exceedance of the limits established in the rule determined by any of the applicable test methods constitutes a violation of this rule.

502.1 Compliance Determination: The following means shall be used to determine compliance with this rule. For routine information collection, the Control Officer may accept a manufacturers data sheet, data certified by an officer of the supplying company, or test data for the product model of inquiry.

a. VOC Content: The VOC content of solutions, dispersions, emulsions, and conforming solvents (reference Section 207) shall be determined by one of the following methods:

(1) South Coast Air Quality Management District Method 313-91 as referenced in subsection 502.2f; or

(2) Bay Area Air Quality Management District Method 31 as referenced in subsection 502.2e; or

(3) Solids-free solutions, in which all organic components are VOCs, may be tested using Maricopa County Reference Method #100, "Total Organic Carbon for Windshield Washer Fluids", Maricopa County Air Pollution Control Rule 344 (April 7, 1999).

b. Vapor Pressure: Pursuant to Sections 304 and 207, determination of the total VOC vapor-pressure (VOC composite partial-pressure) in a cleaning solution shall be performed as follows:

(1) For solutions known to be nearly or exactly 100 percent VOC, vapor pressure shall be determined by ASTM D2879-92 as referenced in subsection 502.2g; or

(2) For solutions for which is known the exact quantity and chemical makeup of each evaporating component that is not a VOC, ASTM D2879-92 (referencing subsection 502.2g) shall be used (to determine the gross composite vapor pressure) in conjunction with calculations using the vapor-pressure formula in subsection 502.3.

(3) When a solution's exact species and proportions are known for all ingredients, the Control Officer may use the formula in subsection 502.3 in conjunction with standard reference texts or data-bases that provide the vapor pressure value of each constituent, or a combination of formula use and actual testing on real constituents (referencing subsection 502.2g).

c. ECS Compliance:

(1) The VOC content of gaseous emissions entering and exiting an ECS shall be determined by either EPA Method 18 referred to in subsection 502.2b, or EPA Method 25 or its submethod, referred to in subsection 502.2c.

(2) Capture efficiency of an emission control device used pursuant to Section 304, subsection 305.4, subsection 306.4, and/or subsection 307.4 shall be determined either by the methods in 502.2d (EPA Method 204 and its submethods), or by using mass balance calculation methods in concert with the methods in 502.2a (EPA Methods 2, 2a, 2c, and 2d).

d. Temperature Measurement: Temperature measurements made pursuant to Section 214 to determine if a cleaning machine contains a "heated solvent" shall be done with an instrument having an accuracy and precision of no less than 1 degree Fahrenheit.

502.2 Test Methods Adopted By Reference: The EPA test methods as they exist in the Code of Federal Regulations (CFR) (July 1, 1998), as listed below, are adopted by reference. The other test methods listed here are also adopted by reference, each having paired with it a specific date that identifies the particular version/revision of the method that is adopted by reference. These adoptions by reference include no future editions or amendments. Copies of test methods referenced in this Section 502 are available at the Maricopa County Environmental Services Department, 1001 North Central Avenue, Phoenix, AZ, 85004-1942.

a. EPA Methods 2 ("Determination of Stack Gas Velocity and Volumetric Flow Rate"), 2a ("Direct Measurement of Gas Volume Through Pipes and Small Ducts"), 2c ("Determination of Stack Gas Velocity and Volumetric Flow rate in Small Stacks or Ducts"), and 2d ("Measurement of Gas volumetric Flow Rates in Small Pipes and Ducts"). All 4 of the foregoing methods are in 40 CFR 60, Appendix A.

b. EPA Method 18 ("Measurement of Gaseous Organic Compound Emissions by Gas Chromatography") and its submethods (40 CFR 60, Appendix A).

c. EPA Method 25 ("Determination of Total Gaseous Nonmethane Organic Emissions as Carbon") and its submethods (40 CFR 60, Appendix A).

d. EPA Test Methods 204 ("Criteria For and Verification Of a Permanent or Temporary Total Enclosure"), 204a, 204b, 204c, 204d, 204e, and 204f (Appendix M, 40 CFR 51).

e. California's Bay Area Air Quality Management District (BAAQMD) Method 31 (April 15, 1992), "Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners, and Low Solids Coatings".

f. California's South Coast Air Quality Management District (SCAQMD) Method 313-91 (April 1997).

g. American Society for Testing and Materials (ASTM) Method D2879-92 (1992).

502.3 FORMULA FOR VOC COMPOSITE PARTIAL PRESSURE: Equivalent to: **TOTAL VOC VAPOR-PRESSURE.**

$$PP_c = \frac{\sum_{i=1}^{n} (W_i)(VP_i) / MW_i}{\frac{W_w}{18} + \sum_{i=1}^{m} \frac{W_{ej}}{MW_{ej}} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

W_i = Weight of the "i"th VOC compound in grams

W_w = Weight of water in grams

W_{ej} = Weight of the "j"th non-precursor compound in grams

MW_i = Molecular weight of the "i"th VOC compound in grams per gram mole, e.g., one gram-mole of isopropyl alcohol weighs 60 grams

MW_{ej} = Molecular weight of the "j"th non-precursor compound, e.g., 1 gram-mole of acetone weighs 58 grams

PP_c = VOC composite partial pressure at 20°C in mm mercury (Hg)

VP_i = Vapor pressure of the "i"th VOC compound at 20°C in mm Hg

18 = Weight of one gram-mole of water

APPENDIX TO RULE 331

VAPOR CLEANING MACHINES and EMISSION CONTROL SYSTEMS

I. DEFINITIONS (Appendix)

(1) VAPOR LEVEL CONTROL SYSTEM - A combination of a coolant sensing system and a vapor sensing system consisting of the following three sets of features:

A. A condenser flow switch and thermostat which shuts off the sump heat if either the condenser coolant stops circulating or becomes warmer than 85°F (29°C); and

B. A manually-reset safety switch which turns off the sump heater if the temperature sensor senses that the temperature is rising above the designed operating level at the vapor/air interface; and

C. A manually-reset switch which turns off the spray-system pump if the level of the vapor/air interface drops more than 4 inches (10 cm).

II. BATCH-LOADED VAPOR DEGREASING: No person shall operate a batch-loaded vapor cleaning machine unless the machine either meets National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370) as if the cleaning-solvent in use were subject to subpart T Standards and the Standards are adjusted for the solvent's own boiling point, OR the machine is equipped with the following:

(1) An impermeable cover that is a sliding, rolling, fanning, or guillotine (bi-parting) type which is designed to easily open and close without disturbing the vapor zone; and

(2) A vapor level control system; and

(3) A primary condenser that maintains an exit temperature not exceeding 85°F (29°C) or be equipped pursuant to subsection II(6)B of this Appendix; and

(4) A freeboard ratio that is greater than or equal to 0.75.

(5) Lip Exhaust: Vapor cleaning machines with lip exhausts shall be controlled by an ECS.

(6) Additional Controls – Refrigeration Or ECS: Batch loaded vapor cleaning machines having any of the following descriptors shall comply with subsection II(6)A or II(6)B or II(6)C of this Appendix:

- an evaporative surface area greater than 13 ft^2 (1.21 m^2); or
- installed or subject to major modification after November 1, 1999, or
- having average monthly VOC emissions exceeding 31 pounds VOC per square foot of solvent surface area:

A. A refrigerated freeboard chiller for which the chilled air blanket temperature in degrees Fahrenheit at the coldest point on the vertical axis through the horizontal center of the vapor/air interface either shall be no greater than 30 percent of the initial boiling point of the solvent in degrees Fahrenheit or no greater than 40.0°F (4.4°C); or

B. A refrigerated condenser coil (in place of an unrefrigerated coil) having a minimum cooling capacity of 100 percent of the boiling-sump heat input rate and conforming to the air-blanket temperature requirements pursuant to foregoing subsection II(6)A; or

C. An Emission Control System (ECS) operated in accordance with subsection IV of this Appendix.

(7) Workloads:

A. A workload shall not occupy more than half of the cleaning machine's open-top area.

B. The workload shall not be so massive that the vapor level drops more than four inches (10 cm) when the workload is removed from the vapor zone.

C. Do not spray cleaning-solvent above the vapor/air interface level.

(8) Prevent Carry-Out: Minimize cleaning-solvent carry-out by the following measures:

A. Orient the items being cleaned in such a way that the items drain easily after cleaning.

B. Degrease the workload in the vapor zone at least 30 seconds or until condensation ceases.

C. For manual loading/unloading, tip out any pools of solvent on the cleaned parts before removal.

D. Allow parts to dry within the cleaning machine until visually dry.

(9) Starting And Stopping: The following sequence shall be used for start-up and shut-down:

A. When starting the cleaning machine/cleaner, the cooling system shall be turned on before, or simultaneously with, the sump heater.

B. When shutting down, the sump heater shall be turned off before, or simultaneously with, the cooling system.

(10) Water should not be visually detectable in the VOC-containing solvent exiting the water separator.

(11) Blasting in a vapor cleaning machine shall be done within a Sealed System or be controlled by an ECS. .

(12) An owner or operator operating a vapor cleaning machine shall keep record pursuant to Section 501 of this rule.

III. IN-LINE VAPOR DEGREASING: No person shall operate an in-line vapor cleaning machine (degreaser) unless it either complies with the National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370) adjusted to the applicable solvent boiling point, OR the machine complies with subsections III(1) through III(5) of this Appendix.

(1) Reduce VOC Loss:

A. Prevent Carry-Out: Equip the cleaning machine (degreaser) with either a drying tunnel or another means, such as a rotating basket, sufficient to prevent cleaned parts from carrying out cleaning-solvent liquid or vapor.

B. Within 10 minutes of turning off the solvent heating system, cover the entrance and exit and any opening greater than 16 square inches (104 cm^2).

(2) Minimize Openings: Entrances and exits should silhouette workloads so that the average clearance between parts and the edge of the cleaning machine (degreaser) opening is either less than four inches (10 cm) or less than 10 percent of the width of the opening.

(3) Use a vapor level control system.

(4) Have a freeboard ratio greater than or equal to 0.75.

(5) Have a primary condenser that maintains an exit temperature not exceeding 85°F (29°F); or be equipped pursuant to subsection II(6)B

(6) Meet the requirements of subsection II(6)A or subsection II(6)B or subsection II(6)C of this Appendix.

(7) Meet the requirements of subsections II(9) and II(10) of this Appendix.

(8) An owner or operator operating a vapor cleaning machine shall keep records pursuant to Section 501 of this rule.

IV. EMISSION CONTROL SYSTEM REQUIREMENTS

(1) An Emission Control System (ECS) used pursuant to this rule shall consist of a hood or enclosure to collect emissions, which are vented to a processing device. The overall control efficiency (capture plus processing) of the system shall not be less than 85 percent. The capture system shall have a ventilation rate no greater than 65 cfm per square foot of evaporative surface (20 m^3/min./m^2), unless that rate must be changed to meet a standard specified and certified by a Certified Safety Professional, a Certified Industrial Hygienist, or a licensed professional engineer experienced in ventilation-system design, that concerns health and safety requirements. The ECS shall be approved by the Control Officer.

(2) Operation And Maintenance (O&M) Plan Required For ECS: An owner or operator shall create and maintain an Operation and Maintenance Plan for any ECS required by this Rule 331 or pursuant to an air pollution control permit in accordance with Section 309 of this rule.

(3) Recordkeeping

A. ECS Operation And Maintenance Records: On each day that an ECS is used to comply with any provision of this rule, an owner or operator shall make a permanent record of the operating parameters of the key systems described in the O&M Plan. For each day or period in which the O&M Plan requires that maintenance be performed, a permanent record shall be made of the maintenance actions taken, within 24 hours of

maintenance completion. An explanation shall be entered for scheduled maintenance that is not performed during the period designated in the O&M Plan.

B. Other Records Required When Complying Via ECS: An owner or operator using an ECS pursuant to this rule shall maintain, in addition to the records required by subsection 501.1, daily documentation showing the VOC content of the solvent material and the amount added for makeup.

(4) Test Methods For Determining Emission Control System Compliance: Test methods and compliance procedures for an ECS are in Section 502 of this rule.

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